LISTING OF CLAIMS

1. (Original) An improved catalytic cracking method comprising:
   a) providing a sulfuric acid solution containing greater than about 75 wt.% sulfuric acid;
   b) contacting a nitrogen-containing catalytic cracking boiling range feedstream with the sulfuric acid solution in a first reaction stage under effective conditions and at an acid solution volumetric treat rate greater than about 0.5 vol.%, based on the catalytic cracking boiling range feedstream, wherein greater than about 60 wt.% of the nitrogen compounds contained in said catalytic cracking boiling range feedstream is removed thereby producing a first reaction stage effluent comprising at least a catalytic cracking boiling range effluent and a used sulfuric acid solution; and
   c) conducting at least a portion of said first reaction stage effluent to a second reaction stage wherein said first reaction stage effluent is contacted under effective cracking conditions with a cracking catalyst

2. (Original) The method according to claim 1 wherein the nitrogen-containing cat cracker boiling range feedstream boils in the range of about 430°F to about 1050°F (220-565°C).

3. (Currently Amended) The method according to ~~any preceding~~ claim 2 wherein nitrogen-containing catalytic cracking boiling range feedstream comprises heavy hydrocarbon oils comprising materials boiling above 1050°F (565°C); heavy and reduced petroleum crude oil; petroleum atmospheric

distillation bottoms; petroleum vacuum distillation bottoms; pitch, asphalt, bitumen, other heavy hydrocarbon residues; tar sand oils; shale oil; liquid products derived from coal liquefaction processes; light or heavy cycle oils; and mixtures thereof.

4. (Currently Amended) The method according to ~~any preceding~~ claim 3 wherein the nitrogen-containing catalytic cracking boiling range feedstream comprises vacuum gas oils boiling in the range above about 650°F (343°C).

5. (Currently Amended) The method according to ~~any preceding~~ claim 2 wherein the nitrogen-containing catalytic cracking boiling range feedstream contains about 100 to about 10,000 wppm nitrogen.

6. (Currently Amended) The method according to ~~any preceding~~ claim 2 wherein the nitrogen-containing catalytic cracking boiling range feedstreams has a total metals concentration ranging from about 10 wppm to about 1,000 wppm.

7. (Currently Amended) The method according to ~~any preceding~~ claim 5 wherein the nitrogen present in said nitrogen-containing catalytic cracking boiling range feedstream ~~are~~ is selected from quinolines, substituted quinolines, benzo quinolines, anilines, N-alkyl indoles, alkylarylamines and substituted derivatives thereof, indoles, and carbazoles.

8. (Currently Amended) The method according to ~~any preceding~~ claim 7 wherein said sulfuric acid solution contains greater than about 80 wt.% sulfuric acid.

9. (Currently Amended) The method according to ~~any preceding~~ claim 2 wherein said sulfuric acid solution is a sulfuric acid solution obtained by:

a) combining an olefinic hydrocarbon feedstream containing C_3 to C_5 olefins with isobutane to form a hydrocarbonaceous mixture; and

b) contacting the hydrocarbonaceous mixture with sulfuric acid under conditions effective for producing at least an alkylate and a sulfuric acid solution having an acid concentration of at least about 75 wt.%.

10. (Currently Amended) The method according to ~~any preceding~~ claim 8 wherein greater than about 75 wt.% of the nitrogen compounds contained in said catalytic cracking boiling range feedstream is removed.

11. (Currently Amended) The method according to ~~any preceding~~ claim 8 wherein the treat rate of the sulfuric acid solution is about 0.5 to about 20 vol.%.

12. (Currently Amended) The method according to ~~any preceding~~ claim 5 wherein the nitrogen-containing catalytic cracking boiling range feedstream and the sulfuric acid solution are intimately contacted by a non-dispersive contacting method selected from packed beds of inert particles and fiber film contactors.

13. (Currently Amended) The method according to ~~any preceding~~ claim 5 wherein the nitrogen-containing catalytic cracking boiling range feedstream

and the sulfuric acid solution are intimately contacted by a method selected from mixing valves, mixing tanks or vessels, propeller mixers, in-line static mixers, and orifice plates.

14. (Currently Amended) The method according to ~~any preceding~~ claim 11 wherein the first reaction stage effluent effluent is separated into at least a catalytic cracking boiling range effluent and a used sulfuric acid solution by any means known to be effective at separating an acid from a hydrocarbon stream.

15. (Currently Amended) The method according to ~~any preceding~~ claim 14 wherein the catalytic cracking boiling range effluent and the used sulfuric acid solution are separated by a separation device selected from settling tanks or drums, coalescers, electrostatic precipitators, or other similar device.

16. (Currently Amended) The method according to ~~any preceding~~ claim 14 wherein the catalytic cracking boiling range effluent and the used sulfuric acid solution are separated by fiber film contactors.

17. (Currently Amended) The method according to ~~any preceding~~ claim 6 wherein the catalytic cracking boiling range effluent has a lower total metals concentration than the cat cracker boiling range feedstream.

18. (Currently Amended) The method according to ~~any preceding~~ claim 17 wherein the catalytic cracking boiling range effluent has a total metals concentration ranging from about 20 wppm to about 1000 wppm.

19. (Currently Amended) The method according to ~~any preceding~~ claim 9 wherein water is added to said sulfuric acid solution to adjust the sulfuric acid concentration of said sulfuric acid solution.

20. (Currently Amended) The method according to ~~any preceding~~ claim 19 wherein the sulfur content of said catalytic cracking boiling range effluent is about 0.1 to about 25 % lower than the cat cracker boiling range feedstream.

21. (Currently Amended) The method according to ~~any preceding~~ claim 20 wherein the yield loss resulting from the sulfuric acid solution treatment is about 0.5 to about 30 wt.%.

22. (Original) An improved catalytic cracking method involving removing nitrogen from a nitrogen-containing catalytic cracking boiling range feedstream comprising:

a) providing a sulfuric acid solution containing greater than about 80 wt.% sulfuric acid;

b) contacting a nitrogen-containing catalytic cracking boiling range feedstream boiling in the range of about 430°F to about 1050°F (220-565°C) in a first reaction stage with a sulfuric acid solution under effective conditions and at an acid volumetric treat rate of about 0.5 to about 20 vol.%, based on the catalytic cracking boiling range feedstream, thereby producing a first reaction stage effluent comprising at least a catalytic cracking boiling range effluent and a used sulfuric acid solution, whereby greater than about 75 wt.% of the nitrogen compounds contained in said catalytic cracking boiling range feedstream is removed and said

contacting is achieved through the use of a contacting method selected from non-dispersive and dispersive contacting methods; and

c) conducting at least a portion of said first reaction stage effluent to a reaction stage wherein said first reaction stage effluent is contacted under effective cracking conditions with a cracking catalyst.

23. (New) The method according to claim 22 wherein nitrogen-containing catalytic cracking boiling range feedstream comprises heavy hydrocarbon oils comprising materials boiling above 1050°F (565°C); heavy and reduced petroleum crude oil; petroleum atmospheric distillation bottoms; petroleum vacuum distillation bottoms; pitch, asphalt, bitumen, other heavy hydrocarbon residues; tar sand oils; shale oil; liquid products derived from coal liquefaction processes; light or heavy cycle oils; and mixtures thereof.

24. (New) The method according to claim 23 wherein the catalytic cracking boiling range effluent has a lower total metals concentration than the cat cracker boiling range feedstream.

25. (New) The method according to claim 24 wherein the catalytic cracking boiling range effluent has a total metals concentration ranging from about 10 wppm to about 500 wppm.

26. (New) The method according to claim 22 wherein the non-dispersive contacting method is selected from packed beds of inert materials or fiber film contactors.

27. (New) The method according to claim 22 wherein the catalytic cracking boiling range effluent and the used sulfuric acid solution are separated by a separation device selected from settling tanks or drums, coalescers, electrostatic precipitators, or other similar device.

28. (New) The method according to claim 27 wherein the catalytic cracking boiling range effluent and the used sulfuric acid solution are separated by fiber film contactors.

29. (New) The method according to claim 22 wherein said sulfuric acid solution is a sulfuric acid solution obtained by:

a) combining an olefinic hydrocarbon feedstream containing C_3 to C_5 olefins with isobutane to form a hydrocarbonaceous mixture; and
b) contacting the hydrocarbonaceous mixture with sulfuric acid under conditions effective for producing at least an alkylate and a sulfuric acid solution having an acid concentration of greater than about 80 wt.%.

30. (New) The method according to claim 29 wherein water is added to said sulfuric acid solution to adjust the sulfuric acid concentration of said sulfuric acid solution to about 75 wt.% to about 93 wt.% sulfuric acid.

31. (New) The method according to claim 30 wherein the sulfur content of said catalytic cracking boiling range effluent is about 0.1 to about 15 % lower than the cat cracker boiling range feedstream.

32. (New) The method according to claim 31 wherein the yield loss resulting from the sulfuric acid solution treatment is about 0.5 to about 20 wt.%.

33. (New) An improved catalytic cracking method involving removing nitrogen from a nitrogen-containing catalytic cracking boiling range feedstream comprising:

a) combining an olefinic hydrocarbon feedstream containing C_3 to C_5 olefins with isobutane to form a hydrocarbonaceous mixture;

b) contacting the hydrocarbonaceous mixture with sulfuric acid under conditions effective for producing at least an alkylate and a sulfuric acid solution having an acid concentration of greater than about 80 wt.%.

c) contacting a nitrogen-containing catalytic cracking boiling range feedstream, having a total metals concentration ranging from about 10 wppm to about 1000 wppm and boiling in the range of about 430°F to about 1050°F (220-565°C), in a first reaction stage with a sulfuric acid solution under effective conditions and at an acid volumetric treat rate between about 0.5 and 10 vol.%, based on the catalytic cracking boiling range feedstream, thereby producing a first reaction stage effluent comprising at least a catalytic cracking boiling range effluent and a used sulfuric acid solution, wherein greater than about 90 wt.% of the nitrogen compounds contained in said catalytic cracking boiling range feedstream is removed, wherein said sulfuric acid solution contains between about 85 and 93 wt.% sulfuric acid, based on the sulfuric acid solution, and said contacting is achieved through the use of a contacting method selected from dispersive

contacting methods, and wherein the yield loss resulting from the sulfuric acid solution treatment is about 0.5 to about 10 wt.%.;

d) separating said catalytic cracking boiling range effluent and said used sulfuric acid solution through the use of a separation device selected from settling tanks or drums, coalescers, electrostatic precipitators, or other similar device;

e) recovering at least a portion of said catalytic cracking boiling range effluent wherein said cat cracker boiling range effluent contains a total metals concentration lower than that of said cat cracker boiling range feedstream; and

f) conducting at least a portion said catalytic cracking boiling range effluent to a second reaction stage wherein said catalytic cracking boiling range effluent is contacted under effective conditions with a cracking catalyst.

34. (New) The method according to claim 33 wherein the catalytic cracking boiling range effluent and the sulfuric acid solution are separated by fiber film contactors.

35. (New) The method according to claim 34 wherein after the used sulfuric acid solution and the catalytic cracking boiling range effluent are separated, the sulfuric acid solution thus obtained from this separation is treated to recover any cat cracker boiling range effluent contained therein.

36. (New) The method according to claim 35 wherein the catalytic cracking boiling range effluent recovered is recycled and combined with the catalytic cracking boiling range feedstream.